



Department of Energy  
Oak Ridge Operations  
P.O. Box E  
Oak Ridge, Tennessee 37830

May 12, 1983

RECEIVED  
MAY 16 1983

Y/HG-0111

Rochester University  
School of Medicine  
ATTN: Dr. Thomas Clarkson  
University Medical Center  
P. O. Box RBB, 575 Elmwood Avenue  
Rochester, New York 14642

APPROVED FOR PUBLIC RELEASE	
<i>[Signature]</i>	<i>3/24/84</i>
Technical Information Office	Date

Gentlemen:

REQUEST FOR INTERPRETIVE ASSISTANCE: MERCURY IN SEDIMENTS

Thank you very much for expressing an interest in assisting the Department of Energy, Oak Ridge Operations (ORO), in assessing the significance of mercury levels in East Fork Poplar Creek (EFPC), which flows from our Y-12 Plant through the City of Oak Ridge. Concern has been expressed by the citizenry as to whether a possible health hazard exists with respect to the mercury which is contained in the creek waters and sediments. The gamut of concerns is as follows:

1. Is the creek safe for children to play in or near? Within the range of normal activities of children, is it safe for children to swallow the creek's water or sediment or come into contact with its water or sediment? Is there a potential for significant volatilization of mercury, such that there would be a health threat via the air pathway?
2. With respect to residents living near the creek on a full-time basis or engaging in vigorous recreation (tennis) not too far from the creek, is there a threat to health from the volatilization of mercury?
3. Might there be some other conceivable significant pathway to man for mercury? Does this pathway represent a health threat?

Enclosed is the available information relating to the above questions:

1. Oak Ridge National Laboratory (ORNL) Report dated September 7, 1982, "Mercury Contamination in East Fork Poplar Creek and Bear Creek"

This study revealed that game fish at several sampling stations averaged mercury contents greater than 1.0 ppm, the FDA Action Level,

ChemRisk Document No. 3062

May 12, 1983

in EFPC. Mercury in fish peaked at 2.13 at the headwaters of the creek, nearest the Y-12 Plant, and dropped to an average of 0.56 ppm near the mouth of the creek. As indicated in the ORNL report on page 60, the fish in EFPC are not particularly large. The average bluegill was 89.4g. About two hundred fish contaminated to the average fish-in-stream mercury level would have to be consumed to exceed the FDA recommended annual dose level of 10,950 micrograms of mercury. The State of Tennessee, Department of Public Health, reviewed the ORNL report and decided to post the creek, advising against the consumption of its fish, in November 1982. To a great degree, this action has temporarily relaxed public concern over the contaminated fish issue. The State intends to begin a study group in June composed of the DOE, the State of Tennessee, U.S. EPA, and the Tennessee Valley Authority to study the long-term issues relating to the contaminated fish.

2. Letters dated December 23, 1982, and March 2, 1983, to Mr. Sheldon Johnson, member of a local architect-engineering firm

The first letter describes a sediment and floodplains sampling program upon a piece of land about 4500 stream-feet upstream of a group of tennis courts. The first letter also contains a table providing total mercury sediment concentrations as micrograms of mercury/grams of sediment. The last column contains the results of EPA extractive procedure toxicity testing. Unfortunately, these are not reported in terms of the relevant standard. The table attached to the March 2, 1983, letter contains corrected results. Please note that the sediments do not appear to leach much mercury into the acidic environment of the test. Most of the extracts meet drinking water limits. The sediments are not hazardous waste. One would expect even less leaching under the pH condition of the stream; which ranges from 6 to 7.5 as it leaves our plant two miles further upstream. There is no known industrial outfall between the Y12 Plant and EFPC's mouth. There is a sewage treatment plant about 9 miles downstream of the Y-12 Plant. We believe that inorganic mercury within the creek environment should be in the relatively insoluble mercurous form.

3. Safety and Environmental Control Division Report dated September 20, 1974, "Preliminary Aquatic Survey of East Fork Poplar Creek and Bear Creek, 1974"

Pages 13 and 23 provide a map and results of sampling for mercury in EFPC for several locations along the creek.

4. An Excerpt from the 1982 Annual Environmental Monitoring Report

Page 51 presents a table of mercury levels in fish in the Clinch River. EFPC empties into Poplar Creek which after flowing about six miles, empties into the Clinch River at river mile 12.

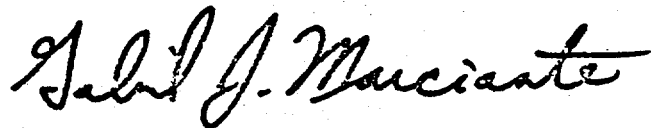
May 12, 1983

It is our intention over the next few days to run samples of sediments through the EPA extractive procedure utilizing creek water, to get a better indication as to the leachability of the sediments under natural conditions. Today, the Y-12 Plant will be express mailing to your office, sediment samples. We thank you very much for your generous offer to analyze the sediments to determine the chemical species of mercury present.

The next enclosure is a list which summarizes our understanding of the EFPC situation. This list is primarily the result of applying physical chemistry considerations towards reviewing the data.

I hope you will be able to modify your tight schedule in order to be able to meet next week with the DOE and representatives of ORNL. A list of possible airline flights between Raleigh-Durham, Knoxville, and Rochester is enclosed. We believe that a face-to-face discussion of the implications of the data with yourself, Chet Richmond, Hans Peter Witschi, and members of the ORO staff would be enlightening and fruitful.

Sincerely,



Gabriel J. Marcianite, Acting Chief  
Environmental Protection Branch  
Safety and Environmental Control Division

SE-331:GJM

Enclosures:  
As stated

bcc w/o encl:

C. R. Richmond, 4500-N, ORNL  
G. G. Fee, 9704-2, Y-12  
J. C. White, 9704-2, Y-12  
T. R. Butz, 9106, Y-12  
J. W. Range, M-4  
J. T. Alexander, M-4  
J. L. Foutch, CC-10  
R. L. Egli, ER-10  
V. J. D'Amico, SE-30  
W. H. Travis, SE-33  
E. W. Bailey, SE-34